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ABSTRACT

The Collaborative Technology Integration (CTI) project consisted of workshops that involved collaboration efforts between faculty members from Mary Washington College (Virginia) and graduate students in instructional technology from West Virginia University. The project paired up individuals from the two schools to work together on the integration of technology into the curriculum. Partners relied on e-mail, file transfer protocol, faxes, and the telephone to share ideas, works in progress, and ideas for future work. The case studies described in this paper demonstrate two extreme examples that comprise the entire CTI project. In one case, the instructional technologist and the content area specialist had little contact over the time period, while the other project involved a team that was in almost daily contact with each other. Varying degrees of commitment to the project were observed in both cases; the degree of commitment was related to the clarity of the vision for the project. Each project, in spite of different degrees of communication, met the goal of technology integration into the target course, demonstrating that modern communications technology enables instructors to tap into the knowledge of experts at different locations. (AEF)

Distance Collaboration and Technology Integration Between Two Institutions

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Collaboration is among the most discussed topics in education today. Teachers are being encouraged to collaborate with each other to improve instruction for their students. Most notably, collaborative efforts between both students and teachers work well with technology integration into the curriculum. In addition to the use of technology to enhance students' learning, technology can also be used to support teachers in the classroom.

Each Spring, Mary Washington College, located in Fredericksburg, Virginia, hosts a faculty workshop. The workshop is a part of Mary Washington College's Faculty Academy that provides a forum for faculty to share innovative teaching practices involving instructional technologies. In April 1997, we became involved in a Faculty Academy project called Collaborative Technology Integration (CTI). The project consisted of workshops that involved collaboration efforts between faculty members from Mary Washington College (MWC) and graduate students in instructional technology from West Virginia University (WVU), in Morgantown, West Virginia. The workshops were hosted by MWC and served to assist the faculty at the college in determining effective uses of technology in the curriculum.

The CTI project paired up individuals from the two schools to work together on the integration of technology into curriculum. Under the leadership of Dr. W. Michael Reed of WVU and Dr. David Ayersman of MWC, 10 MWC faculty and 10 WVU graduate students worked in pairs to facilitate technology integration efforts and to demonstrate the results of integration at the conclusion of the academy. To close the session, each pair presented the products they had produced and discussed the various points related to technology integration, the collaborative process, and the role that distance played.

The Collaborative Process

Most collaborative work consists of a group of individuals working on different aspects of the project. Usually, the group of individuals involved in the project are experts in one or more fields that deal with the content of the project. All of the individuals involved in the project are working together to arrive at the common goal of completing the task (Armstrong 1996).

MWC and WVU participants used a collaborative approach to integrate technology into the curriculum. In the CTI project, the collaborative group consisted of one MWC faculty member, who served as the content area specialist, and one WVU graduate student, who served as the instructional technology specialist. The two project leaders worked together to try to pair up individuals with similar interests whenever possible. Once the partners were determined, they were given the tasks of making the initial contacts and identifying curriculum needs. After the needs assessment, it was up to each instructional technology specialist to begin looking for various solutions to solve the problems. The partners worked together examining pre-integration syllabi and targeting areas for possible integration.

Because the participants were separated by quite a distance (260 miles, about 4 hours driving time), a face-to-face collaboration was not possible. To overcome the distance barrier, the partners of the project relied on e-mail, file transfer protocol (ftp), faxes, and the telephone to share ideas, works in progress, and ideas for future work. There was only one face-to-face meeting during the course of project. This meeting took place the day before final project presentations. In this meeting, the participants finalized plans for the presentations and ensured that the projects fulfilled the original vision. The final project resulted in a presentation to show the work completed by each group to each of the teams involved in each of the other groups.

Technology Integration in the Classroom

Several authors have described the integration of technology in the classroom. Bergeron and Bailin (1996) state that "in many instances, there is a need to educate authors and editors as to the possibilities of hypermedia...and the features of available authoring and editing tools" (p. 19). The instructional technology specialists, because of their experience and research in the area of hypermedia and technology in the classroom, served in this educational role. Armstrong (1996) lists three levels that

faculty must go through in order to thoroughly integrate technology into their curriculum.

The first level is the basic level. At this level, faculty use technology to help present their ideas to the classes. They often use presentation packages as another way of organizing and presenting the information to their classes.

In level two, the intermediate level, faculty expand on these basic packages and change them into something that is more interactive. Faculty work with instructional designers in the areas of storyboarding and multimedia incorporation to involve their students more in the use of hypermedia.

At level three, the advanced level, faculty refine their skills. They are now considered the experts, and will continue to incorporate hypermedia technology in their classes. Now, they are at the level where they can help the faculty members at level one.

This process is a very rigid, defined one. It assumes an abundance of on-site technical expertise, which is not always the case. In this particular project, there were more faculty members that wanted to learn about technology integration than there were experts in this area. For this reason, the program was set up for the benefit of both groups. The faculty benefited by being able to work one-on-one with an instructional technologist to implement computer technology into the classroom, while the graduate students benefited from the experience of working collaboratively. The distance was expected to be a complicating factor as well.

Computer Use in Education

Computers, when used effectively, can significantly enhance students' educational experience in many ways. Kern (1995) found that college French students who used a computer-mediated-communication program interacted in French more often and were more likely to make longer, more complicated expressions in French. Liu and Reed(1995) found that a hypermedia program incorporating sound, video, pictures, and other explanations was effective in helping college English as a second language students learn vocabulary. Moore (1988) found that computer-assisted instruction was effective in improving low-level math students' performance. In an overview of hypermedia and education studies across content areas, Burton, Moore, and Holmes (1995) concluded that hypermedia is at least as effective as conventional teaching methods, and sometimes more effective. It is more efficient than conventional methods in terms of time.

However, not all research has been as promising. In a review of the literature dealing with the effectiveness of computers in the social studies, Berson (1996) concludes that there is simply not enough research in this area, and encourages more. He advises teachers to wait until there is more research with positive results before investing a large amount of money and effort into CAI (Berson, 1996). In explaining the mixed reviews, Wang and Sleeman determine that "until the computer is viewed as an integral part of the educational process, rather than a separate instructional tool mainly for teaching computer literacy and programming, the learner will not have the full benefit of this instructional delivery system." (Wang & Sleeman, 1991, p. 343).

Prior Computer Use

The faculty members involved in the project had a variety of prior experiences with computers, ranging from programming skills to almost no involvement with computers. We assumed that the faculty members with more experience with computers would be more likely to integrate technology into their teaching, and that those with fewer experiences would be hesitant to integrate technology.

The Process and the Finished Projects

After the initial pairing, the instructional technologist made initial contact via e-mail with their faculty partners, who then provided syllabi from classes in which they wished to integrate technology. During the next six weeks, the participants communicated via e-mail, fax, telephone, and postal services to discuss the areas of the syllabus in which computer integration would be beneficial and to exchange materials used in the final product. Some of the faculty had already integrated computers into their curriculum, usually at Armstrong's level one (1996). These content specialists were seeking information from the instructional technologists to suggest further areas for integration. The instructional technologists created a variety of final products in order to meet the needs of the faculty members.

Roblyer (1997) states that for teachers to perform effectively as multimedia authors, they need to acquire knowledge and skill in instructional design as well as other things related to development. The instructional technologists brought their skill and experience in this area. The integration of technology in the curriculum will enhance the learning experience. Berson (1996) indicates that part of the problem with CAI is that it can be disruptive to the usual classroom proceedings. In order to avoid these problems and to integrate technology effectively, there must be a tight focus between technology and traditional methods.

The faculty academy provided this focus. Focusing on the issues of pedagogical innovation and education techniques, the academy expanded on the facilitation of learning and teaching experiences through applications of technology to school curricula and instruction.

Case Studies

The case studies that follow demonstrate two extreme examples that comprise the entire CTI project. In one case, the instructional technologist and the content area specialist had little contact over the time period, while the other project involved a team that was in almost daily contact with each other. When we looked at these two extremes along with the examination of the computer background experience instrument, it revealed that the content specialist who had

the most prior experience had the least amount of contact with his development partner. Conversely, the content area specialist who had little computer experience had high expectations for the possibility of using computers in his class.

Highly Interactive Collaboration: A Case Study

I initiated my first e-mail contact with John, an art professor, on March 17, 1997. I received a reply from a staff member, Shirley, explaining that John had just had surgery and that she would be working with me until he recuperated. Shirley faxed a message explaining John's prior experience with computers. In the message, John stated, "I have ideas of what might be done in my computer applicable studio art courses but not always enough knowledge and background to know how to do what I want." I quickly saw that John knew what he wanted to do, but he did not know exactly how to do it. I was encouraged that he had several ideas for this project. Along with this fax were syllabi for two courses into which he wished to integrate computer technology. I told him that he should pick the one in which he thought the students would benefit the most. John decided to emphasize the Color Theory course.

Later that day, I received another e-mail from Shirley which said, "I will be working with John and you on this project. I hope I can help you both!" Shirley was expressing her commitment to the project, along with John's, which reassured me. They wanted an interactive form of technology, and we clarified compatibility issues. The next day Shirley sent the problem statements for the class to me via Fed-Ex. Reviewing the materials helped me to get an idea of how the course was handled off line as well as giving me an orientation to the class material.

On April 23, John e-mailed that he has been "quite overwhelmed with sundry obligations over the past few weeks, and I don't see the end in sight....I'd like to make up for lost time." This exchange shows the level of commitment John had to the project, which is necessary for it to be completed. Shirley's commitment and interest were equal. On May 4 she expressed a great interest in interactive multimedia. Although our interests were not exactly the same, they complimented each other. The next step was to organize the material I had gathered. I integrated some of our ideas and sent the file electronically to both of them. Fortunately, they were "very impressed" with the first draft of the project.

On May 20, 1997 our first face-to-face meeting took place. During this meeting, we worked on several aspects of the project. We were able to work together to fine tune what I had previously sent to them and to incorporate a few more ideas. Together we reflected on the process in the final presentation and agreed that the collaborative experience was beneficial for all of us. John and Shirley had the content knowledge, and I had the technical expertise. They knew how to express their ideas visually, and I knew how to express ideas verbally.

Low Interactive Collaboration: A Case Study

I was invited to take part in the Faculty Academy at MWC. In the project, my advisor worked with a faculty member from MWC and arranged for teams to be created to integrate technology into curriculum. I looked forward to participating in the project because I would serve as a technology specialist.

I was paired with Dr. C, an MWC faculty member. We had little chance to discuss the project before the start of the academy as we had problems getting started. I e-mailed him to introduce myself and to make the initial contact prior to the workshop, but I received no response. After a period of about three weeks, I tried to make a second contact, but received no reply. After discussing the results of my contact attempts with the project coordinator, I was told that it was almost too late to take part in the workshop, so I made one final attempt to contact my partner. This attempt was successful.

I received an e-mail from my faculty partner containing a syllabus from a Sixteenth Century Studies course along with the URL (Uniform Resource Locator) for a technology integration project that he had previously tried to implement. His ideas for technology integration consisted of constructing a Web scrapbook, a place for students to put together ideas about what they had learned in the course (a knowledge construction approach).

After reviewing the syllabus I received, I took a look at the Web site address. Dr. C's first attempt at technology integration had resulted in an unfinished product. He reported that the project he started "was a one-third-of-the-way-through inspiration last time—by the way, you can see what's up of it now (not much, I'm afraid—I have all the materials but I haven't yet assembled them)." The Web site was just a start of what he wanted to do. The students were collecting Web resources that dealt with the sixteenth century and turning them in to him. Then, during his own time, he was taking those gathered resources and attempting to build a Web site to use in his teaching. Time was the issue in assembling them by the start of the Fall semester.

In the next e-mail message from Dr. C, he stated, "Jim, I'm behind on this: I have had the materials for about 4 months now—images, music, etc.—and I haven't yet put it all up, for a variety of reasons." He also informed me that he had purchased an HTML editor to assemble the materials. Dr. Carpenter welcomed any ideas from me and stated, "I'd like to work with you on designing a project like this one for my 16th-century studies class coming up this fall. Anything you can advise on regarding content, design, and *especially* how to pace the project through the semester (so I don't have a big bag of stuff I have to put together myself) would be most welcome."

It seemed that Michael was looking for ideas about how to incorporate some basic HTML (Hyper Text Markup Language) training into the syllabus so that students could

do some of the page design and assembly of on-line resources. Then, Dr. Carpenter could focus on fine-tuning the students' work. He had tried this approach with another class, but it was also incomplete. He stated, "In this case they've done a little more of the work than the 17th-century people did (I'm getting a little more experienced at this!)," but the need for basic HTML instruction resurfaced.

We had both used a commercial HTML editing package, but we felt it was a bit complicated for use in the class. The major problem was that he had a lot of materials, but didn't have time to put them all together. Teaching HTML seemed to be a good way to get student interaction by having them do the developing. I had previously taught beginning classes on HTML using a simple text editor along with a browser to view the results. My beginning sessions included a lesson that covered such topics as tags, heading sizes, images, and anchors. The whole session focused on a three-hour training session that could supplement his standard instruction. Michael stated "This sounds ideal! I'm very pleased. I did want to walk students through the basics of HTML, but I hadn't wanted to teach them a specific application (at least, not now)."

After receiving his response, I proceeded to develop materials in a presentation package. I felt that Dr. Carpenter could go over the presentation with his class for one three-hour period to teach his students the basics of HTML authoring. I put the presentation in a PDF (portable document format) file for distribution on the Web so that Michael could make the presentation available to students via his Web site. I suggested that he could start the teaching with the three-hour discussion and then follow up by providing the information on-line.

I e-mailed Dr. Carpenter with the attachments and he seemed pleased with what we had accomplished. Our technology integration plan consisted of one three-hour basic HTML authoring session for students who registered for his class. Without investing a lot of time or collaboration techniques, we were both happy with the outcome of our project. It seems that those who know most about technology do not require major technology integration.

Conclusions

In analyzing the communications and the processes of these two case studies, several themes were evident. We observed varying degrees of commitment to the project in both cases. The degree of commitment was related to the clarity of the vision for the project. In the high-interaction collaboration, the content specialist had a clear vision of the project from an early stage. This vision allowed the participants to retain their commitment to the project through the stress of other responsibilities. In the low-interaction project, because of a lack of vision of the project, it was easier to push the commitment to the project aside in favor of other commitments.

Communication was an important issue. In the high-interaction collaboration, the participants used various means of communication available. This interaction featured five faxes, numerous e-mail messages and numerous telephone calls. In the low-interaction collaboration, the participants e-mailed each other three times. The participant with little experience had a concrete idea of a project that would integrate technology, but required assistance in translating his idea into a program.

Due to the use of modern communications technology, distance was a non-issue. E-mail and faxes provided almost instantaneous feedback, and the telephone provided real-time communication. Only one technology that was anticipated to be helpful was not: videoconferencing. The lack of videoconferencing, however, did not have a detrimental effect on the collaborative process.

We discovered that, in spite of the different degrees of communication, each project had met the goal of technology integration into the target course, demonstrating that modern communications technology enables instructors to be able to tap into the knowledge of experts at different locations. This implication holds much promise for the future of technology integration into the classroom.

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